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Total Number of Pages in This Submission

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Filing Date	November 28, 2001
First Named Inventor	Whitman et al.
Art Unit	2823
Examiner Name	B. Kebede
Attorney Docket Number	2269-4294.2US (98-1208.02/US)

ENCLOSURES ***(check all that apply)***

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☒ Reply Brief (7pages)
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
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- ☐ CD, Number of CD(s) ____
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- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) *(please identify below)*:

Remarks

The Commissioner is authorized to charge any additional fees required but not submitted with any document or request requiring fee payment under 37 C.F.R. §§ 1.16 AND 1.17 TO Deposit Account 20-1469 during pendency of this application.

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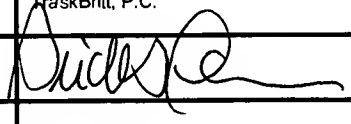
Signature			
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Whitman et al.

Serial No.: 09/997,019

Filed: November 28, 2001

For: SPIN COATING FOR MAXIMUM FILL CHARACTERISTIC YIELDING A PLANARIZED THIN FILM SURFACE

Confirmation No.: 6139

Examiner: B. Kebede

Group Art Unit: 2823

Attorney Docket No.: 2269-4294.2US

NOTICE OF EXPRESS MAILING

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REPLY BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attn: Board of Patent Appeals and Interferences

Sir:

This Reply Brief is being submitted in response to the Examiner's Answer dated December 16, 2005, within two months of the mailing date of the Examiner's Answer, and is in compliance with 37 C.F.R. § 41.41(a). Sections I-III, V, VI, and VIII-XI were not disputed by the Examiner.

IV. STATUS OF AMENDMENTS

The Examiner is correct that, in the specific section mentioned, claims 1-22, rather than claims 1-17, were rejected.

VII. ARGUMENT

A. Rejections Under 35 U.S.C. § 102(e)

It has been asserted, at page 9 of the Examiner's Answer, that Appellants' explanations as to why independent claim 1 recites subject matter which, under 35 U.S.C. § 102(e), is allowable over the subject matter described in Wang mischaracterizes the scope of claim 1.

It is respectfully submitted that the scope of claim 1 has not been mischaracterized.

In this regard, with respect to the requirements of independent claim 1 of "providing a semiconductor device structure including at least one recess formed in a surface thereof and a first material layer substantially filling the at least one recess and covering the surface, the first material layer having a nonplanar surface[,] . . . applying a second material to the first material layer[,] . . . and spreading the second material over the first material layer so as to form a second material layer having a planar surface without requiring subsequent planarization of the second material," nothing more than the language that appears in independent claim 1, and the understanding thereof by one of ordinary skill in the art, has been argued by Appellants.

The phrase "substantially planar" has to be given its ordinary and customary meaning. "Substantially planar" necessarily includes both planar and minor deviations from planar that one of ordinary skill in the art would consider to be within reasonable tolerances of planar. It was

submitted on page 20 of the Examiner's Answer that *Playtex Products Inc. v. Proctor & Gamble Co.*, 73 USPQ2d 2010, 2015 (Fed. Cir. 2005) be considered with respect to the meaning of "substantial" or "substantially planar." *Playtex Products* actually reinforces Appellants' previously submitted position with respect to how the term "substantially planar" should be interpreted. The *Playtex Products* court noted that "substantially flattened surfaces" included both "flat surfaces" and "materially flatter" surfaces. *Id.* at 2016. As applied to the above-referenced application, "substantially planar" clearly includes both "planar surfaces" and "materially planar" surfaces, but does not include surfaces with depressions. Accordingly, even if interpreting planar in light of the specification, planar still means planar.

It has been asserted at pages 9 and 10 of the Examiner's Answer that nothing in claim 1 specifies a degree of planarization equal to 100% planar. It is respectfully submitted that the claim 1 recitation of "planar" does not require a degree of planarization. It is also noted that requiring a "degree of planarization" of "substantially planar" would be analogous to placing a numerical limitation on the planarization – an approach that was specifically condemned by the *Playtex Products* court. *Id.* at 2015 ("the definition of 'substantially flattened surfaces' adopted by the district court introduces a numerical tolerance to the flatness of the gripping area surfaces of the claimed applicator. That reading contradicts the recent precedent of this court, interpreting such terms of degree.").

It is further asserted on page 14 of the Examiner's Answer that the Van Zandt reference has no relevance. It is respectfully submitted that the principles taught in Van Zandt may be even more pronounced as applied to Wang in that the preferred "smoothening layer" of Wang is

comprised of spin-on glass. Col. 6, lines 43-51. Spin-on glass likely has much higher viscosity than the resists discussed in Van Zandt and, therefore, is more likely to have a nonplanar surface than the resists discussed in Van Zandt.

As Wang describes a surface that includes slight depressions, that surface is not planar, as would be required to anticipate each and every element of independent claim 1.

With respect to the 35 U.S.C. § 102(e) rejection of claim 10, page 15 of the Examiner's Answer sets forth two possible claim interpretations. First, that the initial step of a spin-coating process, before a material has had an opportunity to spread results in some surfaces not being coated while other surfaces are coated. The second interpretation is that after a spin-coating process has been performed, a portion of the spun material may be removed, thereby exposing a peak of a first material layer. Examiner's Answer, page 10. It appears that the Examiner does not appreciate the scope of claim 10.

Claim 10 recites, "wherein spreading comprises at least partially filling at least one valley of the first material layer with the stress buffer material while leaving at least one peak of the first material layer substantially uncovered by the stress buffer material." Claim 10 indirectly depends from claim 1 which recites "spreading the second material over the first material layer so as to form a second material layer having a planar surface without requiring subsequent planarization of the second material."

Regarding the first interpretation by the Examiner, the specific planar surface of claim 10 has to be "over the first material layer." In the spin-coating embodiment, claim 10 clearly refers

to the state of a wafer after a material has been spread by centrifugal forces. Regarding the Examiner's second interpretation, at least one peak of the first material layer is substantially uncovered, or planarization occurs, in a subsequent process, as evidenced by the Examiner's reliance upon Wang.

The language of claim 10 is clear: "spreading comprises at least partially filling . . . while leaving at least one peak . . . uncovered.

Wang lacks any express or inherent description of the subject matter recited in claim 10.

Claims 13 and 15 are both allowable, among other reasons, including those that have been set forth in the Appeal Brief, for depending from claim 10, which is allowable.

(B) Rejections Under 35 U.S.C. § 103(a)

It has been asserted that one of ordinary skill in the art would have been motivated to combine the teachings of Wang with those of U.S. Patent 6,117,486 to Yoshihara (hereinafter "Yoshihara") to render unpatentable the subject matter recited in claims 3-5. Examiner's Answer, pages 18 and 19.

Yoshihara teaches spinning a semiconductor wafer at high speeds, rapidly reducing the speed to a slower speed for a time, and re-increasing it to high speeds. Col. 10, lines 4-15. Yoshihara does not teach or suggest gradually decreasing the rate of spinning to a second speed, as recited in claim 3. Yoshihara teaches that the speed is "drastically reduced." Col. 10, lines 8-10. Yoshihara teaches a deceleration of 30,000 rpm/s. Col. 14, lines 28-31. That is three

times any other rate of change taught in the reference. *See* Col. 9, lines 54-61; col. 14, lines 52-60. Such deceleration is clearly not "gradually decreasing," even compared to the other speed changes in the reference. Wang does not cure Yoshihara's failings.

Additionally, Yoshihara does not teach or suggest that re-increasing of the rate of spinning of the substrate is effected gradually, as recited in claim 3. Rather, Yoshihara merely teaches and suggests that the rate of spinning is re-increased. Wang likewise lacks any such teaching or suggestion of gradually increasing the rate of spinning.

Furthermore, Yoshihara teaches that by spinning a semiconductor wafer at high speeds, drastically lowering the speed for a time, and re-increasing it to high speeds, the wafer can be coated with material in such a way that the material layer has a substantially *uniform thickness*. Yoshihara does not ever discuss the effects of Yoshihara's techniques upon a semiconductor wafer with recesses. Clearly, it is not possible for a layer which has a substantially uniform thickness and which is formed over a nonplanar surface to have a planar surface.

While Wang does teach a recess in a semiconductor wafer, it is respectfully submitted that neither Yoshihara nor Wang supplies any motivation for one of ordinary skill in the art to apply teachings from Yoshihara to Wang in such a way as to spread a second material over a first material layer so as to form a second material layer having a planar surface without requiring subsequent planarization of the second material.

Therefore, a *prima facie* case of obviousness has not been established against the subject matter recited in any of claims 3-5.

Claims 8 and 9, which have also been rejected under 35 U.S.C. § 103(a), are both allowable, among other reasons, including those presented in the Appeal Brief, for depending directly or indirectly from claim 1, which is allowable.

XII. CONCLUSION

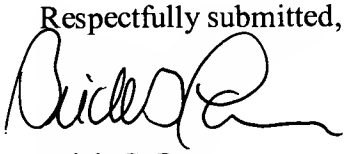
(A) Claims 1, 2, 6, 7, and 10-22 recite subject matter which, under 35 U.S.C. § 102(e), is novel over the subject matter described in Wang;

(B) Claims 3-5 are allowable under 35 U.S.C. § 103(a) for being drawn to subject matter which is patentable over the teachings of Wang, in view of teachings from Yoshihara;

(C) Claims 8 and 9 recite subject matter which, under 35 U.S.C. § 103(a), is patentable over teachings from Wang and Hsieh.

In view of the foregoing, it is respectfully requested that the Examiner's rejections of claims 1-22 be reversed and that each of these claims be allowed.

Respectfully submitted,



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Date: February 16, 2006

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